FIG. 1

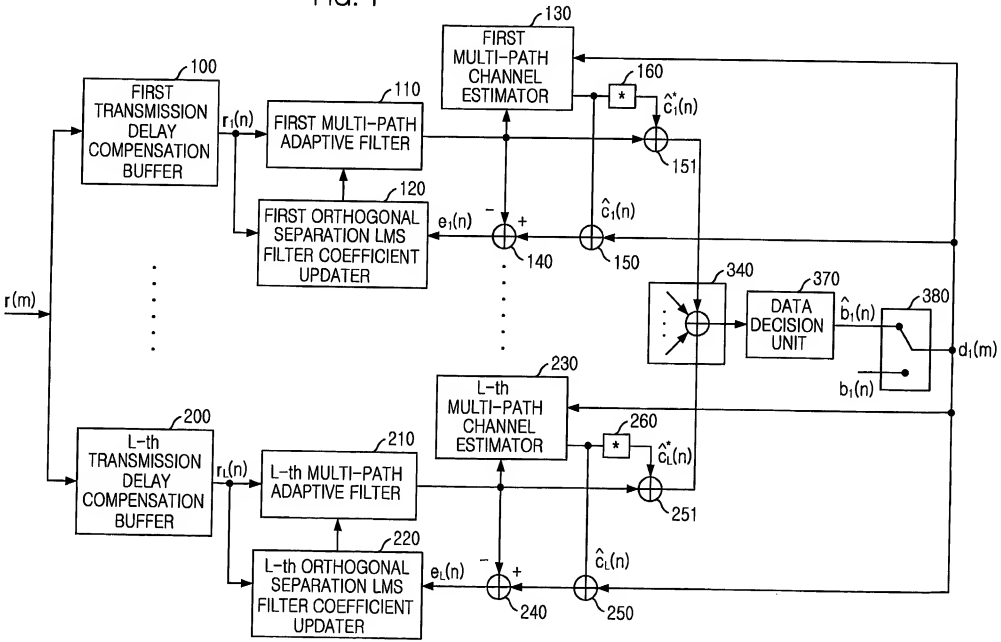
r(m)
100
FIRST TRANSMISSION DELAY COMPENSATION BUFFER
$r_1(n)$
110
FIRST MULTI-PATH ADAPTIVE FILTER
120
FIRST ORTHOGONAL SEPARATION LMS FILTER COEFFICIENT UPDATER
$e_1(n)$
130
FIRST MULTI-PATH CHANNEL ESTIMATOR
160
$\hat{c}_1^*(n)$
151
$\hat{c}_1(n)$
140
150
340
370
DATA DECISION UNIT
$\hat{b}_1(n)$
380
$d_1(m)$
$b_1(n)$
200
L-th TRANSMISSION DELAY COMPENSATION BUFFER
$r_L(n)$
210
L-th MULTI-PATH ADAPTIVE FILTER
220
L-th ORTHOGONAL SEPARATION LMS FILTER COEFFICIENT UPDATER
$e_L(n)$
230
L-th MULTI-PATH CHANNEL ESTIMATOR
260
$\hat{c}_L^*(n)$
251
$\hat{c}_L(n)$
240
250

FIG. 2

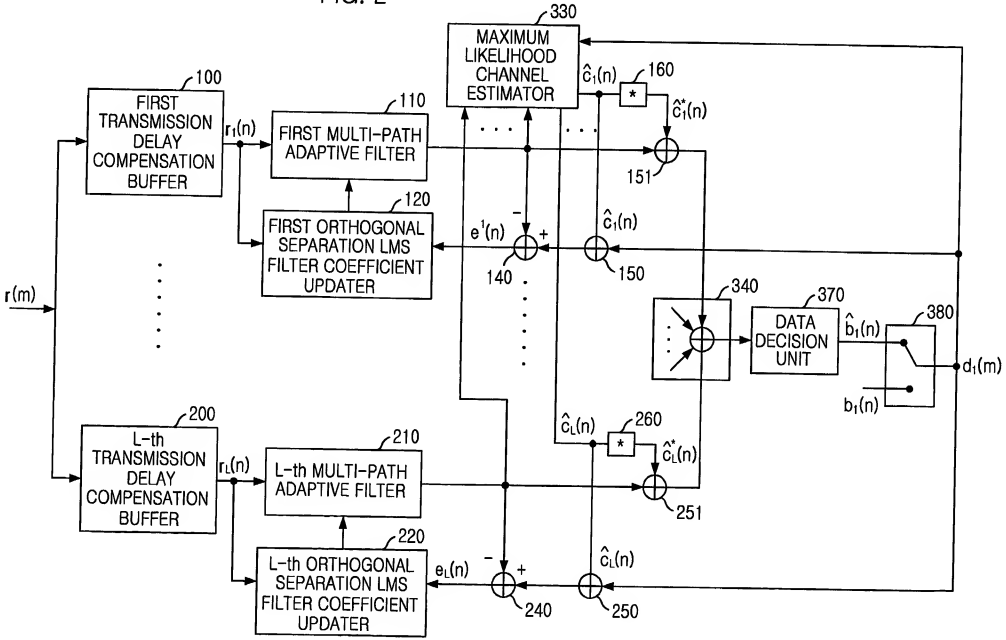
330
MAXIMUM LIKELIHOOD CHANNEL ESTIMATOR
100
FIRST TRANSMISSION DELAY COMPENSATION BUFFER
110
FIRST MULTI-PATH ADAPTIVE FILTER
120
FIRST ORTHOGONAL SEPARATION LMS FILTER COEFFICIENT UPDATER
160
151
150
140
340
370
DATA DECISION UNIT
380
r(m)
200
L-th TRANSMISSION DELAY COMPENSATION BUFFER
210
L-th MULTI-PATH ADAPTIVE FILTER
220
L-th ORTHOGONAL SEPARATION LMS FILTER COEFFICIENT UPDATER
260
251
250
240

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FIG. 3

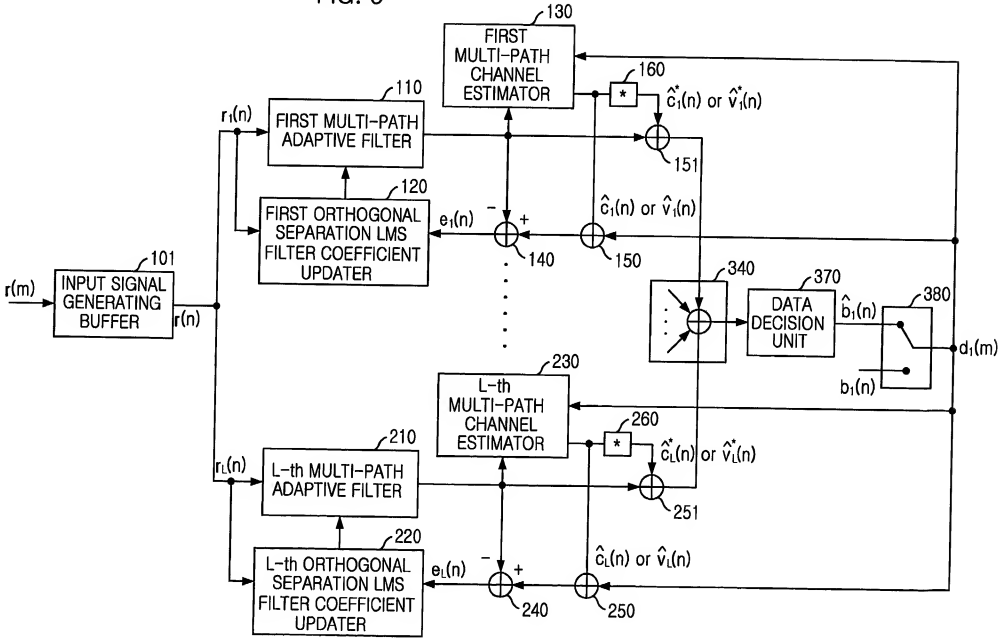

FIG. 4

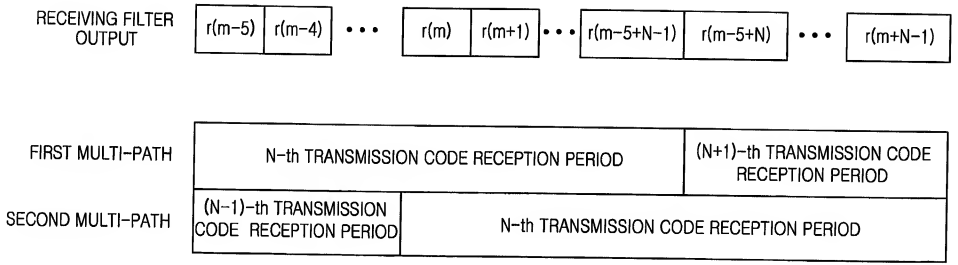
RECEIVING FILTER OUTPUT
r(m-5)
r(m-4)
r(m)
r(m+1)
r(m-5+N-1)
r(m-5+N)
r(m+N-1)
FIRST MULTI-PATH
N-th TRANSMISSION CODE RECEPTION PERIOD
(N+1)-th TRANSMISSION CODE RECEPTION PERIOD
SECOND MULTI-PATH
(N-1)-th TRANSMISSION CODE RECEPTION PERIOD
N-th TRANSMISSION CODE RECEPTION PERIOD

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FIG. 5

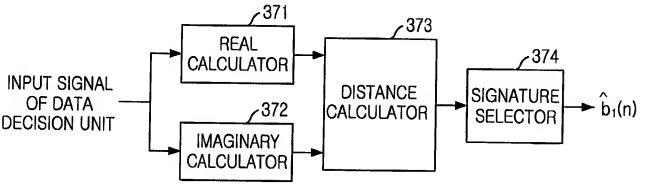


FIG. 6

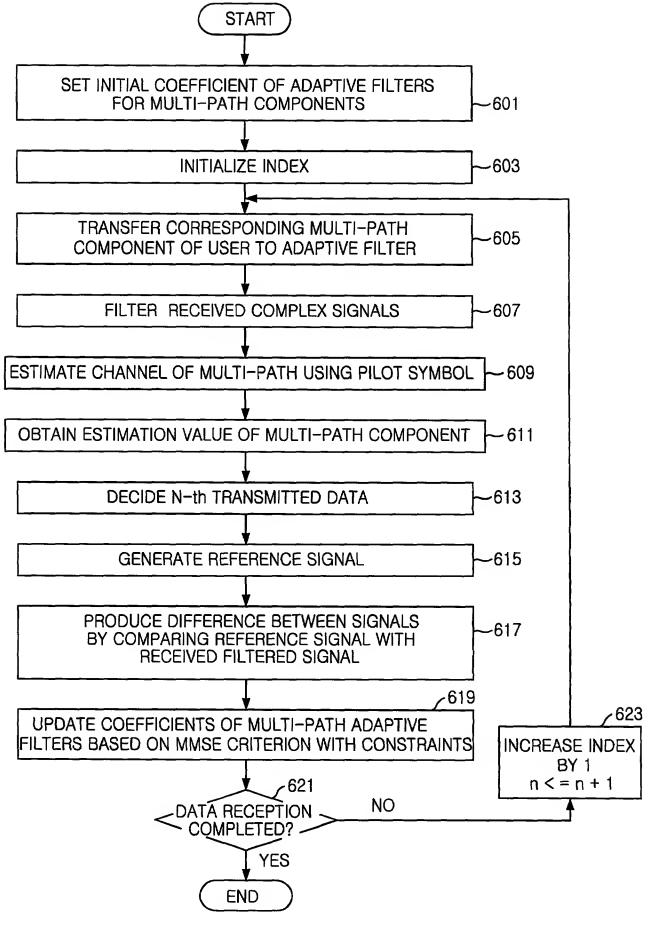
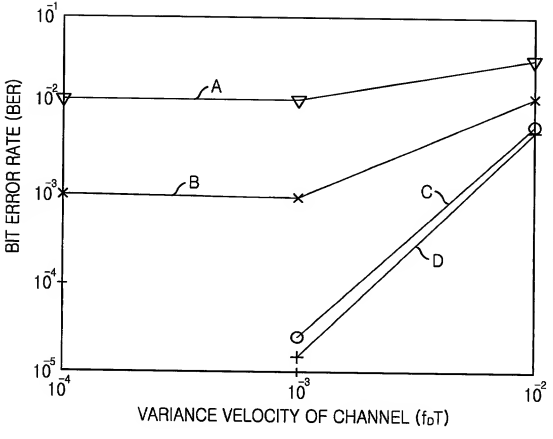

START
SET INITIAL COEFFICIENT OF ADAPTIVE FILTERS FOR MULTI-PATH COMPONENTS
601
INITIALIZE INDEX
603
TRANSFER CORRESPONDING MULTI-PATH COMPONENT OF USER TO ADAPTIVE FILTER
605
FILTER RECEIVED COMPLEX SIGNALS
607
ESTIMATE CHANNEL OF MULTI-PATH USING PILOT SYMBOL
609
OBTAIN ESTIMATION VALUE OF MULTI-PATH COMPONENT
611
DECIDE N-th TRANSMITTED DATA
613
GENERATE REFERENCE SIGNAL
615
PRODUCE DIFFERENCE BETWEEN SIGNALS BY COMPARING REFERENCE SIGNAL WITH RECEIVED FILTERED SIGNAL
617
619
UPDATE COEFFICIENTS OF MULTI-PATH ADAPTIVE FILTERS BASED ON MMSE CRITERION WITH CONSTRAINTS
623
INCREASE INDEX BY 1
n <= n + 1
621
DATA RECEPTION COMPLETED?
NO
YES
END

FIG. 7


BIT ERROR RATE (BER)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
A
B
C
D
10^{-4}
10^{-3}
10^{-2}
VARIANCE VELOCITY OF CHANNEL (f_DT)